Integrated Data for Evaluation and Assessment (IDEA) Project

Preliminary Report on Project Evaluation:

Data Collection and Analysis Plan Development

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Prepared by

Thomas & Associates, Inc.

For the

Montana IDEA Project

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1 Summary

1.1 Background[1]

Local public health agencies in Montana use a variety of standalone data systems, which were established to meet the needs of the individual programs they support. More than fifteen separate data systems contain information about many of the same clients served by one or more local programs. Those local programs are funded in part by state and federal agencies that require unduplicated reporting on clients and client outcomes. Without integration of data capture and retrieval, these systems cannot facilitate, and may hamper, efforts to coordinate services among local public health programs, track client progress, and provide required reports.

Montana's Integrated Data for Evaluation and Assessment (IDEA) is a project within the Health Policy Services Division (HPSD) of the State's Department of Public Health and Human Services (DPHHS). The project goals are:

- **To streamline and integrate the many data systems supporting local public health services.**
- **To bring the integrated data into a statewide information center where data may be linked for local and state program evaluation and health assessment.**

In partnership with independent local health departments, IDEA is scheduled to begin installing local integrated and linked data systems in 2000.

The programs included within the IDEA project are:

- **WIC**
- **Maternal and Child Health Programs, including**
  - **Follow Me, a home visiting program for children with special health care needs (CSHCN) and their families**
  - **Montana's Initiative for the Abatement of Mortality in Infants (MIAMI)**
- **Immunization**
- **Family Planning**
- **Special Health Services**
- **Medicaid**

MT IDEA consists of four phases, described in the following table.

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[1] **Information contained in this Summary was gleaned in large part from the DPHHS' Website. Readers are encouraged to review the complete information at http://www.dphhs.mt.gov/hot/idea.htm.**

Phase	Description
I	Develop a comprehensive, robust Public Health Data System (PHDS) for data capture, case management, and reporting for local health department programs other than WIC.
II	Develop a web-enabled Sharing of Public Health Information (SOPHI) to link PHDS, WIC, and other local health services to share demographic information and facilitate referrals.
III	Develop an IDEA Information Center (InfoCenter) as a state-level repository of evaluation and assessment data for use by local and state analysts and managers.
IV	Develop electronic linkages with private providers, birthing hospitals, and related information systems in other DPHHS divisions to extend IDEA's information sharing capabilities.

1.2 Approach

The evaluation of the Montana IDEA Project uses a multi-faceted approach for specific reasons. Montana has a low population density that demands this tactic to provide reliable measures of service delivery and outcome. (Section 4.1 provides more detail on the small-numbers problem posed by Montana's widely dispersed population.) IDEA provides a technological focal point for a variety of new processes and systems, which also requires a unique evaluation methodology.

The IDEA evaluation approach is based on a theoretical chain linking improved data systems to improved outcomes. The analytic approach is time series analysis used to test the effect of system implementation in a variety of settings. Data are captured for each link in the causal chain, at six-month intervals, with duplication of measures and data sources to increase the likelihood of reliable, generalizable results.

- **Causal Chain**
  - **Improved information systems lead to**
  - **Improved processes, which lead to**
  - **Improved services, which lead to**
  - **Improved outcomes, which lead to**
  - **Increased value of public health services and reduced cost of publicly funded health care.**
- **Techniques**
  - **Time series analysis**
    - **Compares the same measures before and after system implementation**
    - **Repeats measurement bi-annually as later phases are implemented**
    - **Uses trends over time to demonstrate project effectiveness**
  - **Comparison across types of local public health systems**
    - **Identifies public health agencies—county health departments, health department satellite offices, tribal health departments, Indian Health Service (IHS) facilities, and private organizations providing public health services—as to complexity of organizational and geographic mix.**

- **Using WIC and MCH service systems compares local health services that are physically co-located to those that are electronically co-located and physically and/or organizationally separated.**
- **Tests the hypothesis that the barriers of physical or organizational separation will be overcome by electronic integration and linking. (The null hypothesis is that measures of program effectiveness do vary according to the organizational and geographic complexity of service systems.)**

- **Data**
  - **Multiple measures**
    - **Reduce "small numbers" variability**
    - **Strengthen evidence linking improved data capture and use to positive outcomes**
  - **Multiple sources of data**
    - **Current and new local systems**
    - **Client and staff surveys**
    - **Statewide data systems serving essentially the same population**
    - **Population-based, statewide data systems**

1.3 Evaluation Purpose

The evaluation of the IDEA Project addresses two fundamental questions.

- **Is the new IDEA software helping local and state public health workers?**
- **Do public health clients perceive a difference in public health service delivery?**

Specifically, the IDEA evaluation will test whether electronic integration and electronic co-location for local public health agencies accomplishes the following goals:

- **Facilitates streamlined data capture and referrals between and among agencies.**
- **Improves case management and service efficiency.**
- **Improves clerical/administrative support of maternal and child-health related services at local public health departments.**
- **Improves local and state capability for assessing population needs and evaluating program effectiveness**.

1.4 Evaluation Team

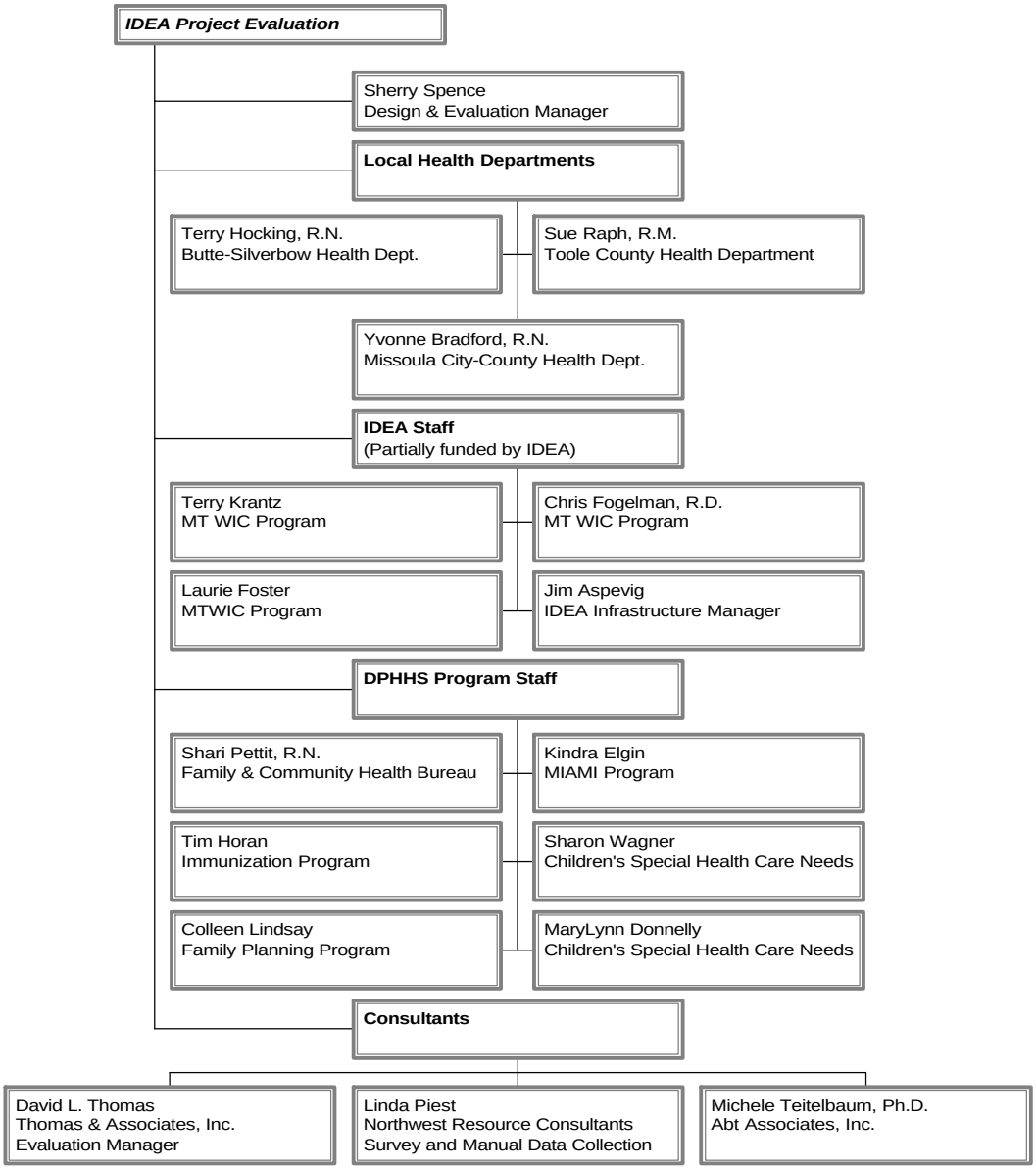
The IDEA evaluation team began meeting in 1997. The team's objectives were the following:

- **Develop a protocol based on the evaluation plan presented in the WIC-IDEA grant application and incorporating the full scope of IDEA evaluation across all phases and funding sources**

- **Design data collection procedures and instruments**
- **Complete and publish the IDEA Evaluation Plan**
- **Conduct the evaluation and report on findings**

The organization of the evaluation team appears in Chart 1 on the following page.

Chart 1: IDEA EVALUATION TEAM



1.5 Timeline

The estimated timeline for MT IDEA evaluation is described in the table below.

Date	Milestone
October – November 1999	**Complete baseline data collection documents and plans**
January – February 2000	**Pretest local level data collection tools at PHDS pilot sites**
February – April 2000	**Complete study design**
March – May 2000	**Collect state-level baseline data**
Spring 2000	**Pilot test IDEA Public Health Data System (PHDS)**
July 2000	**Publish initial evaluation report**
Summer and Fall 2000	**Collect local-level baseline data**
October 2000 – April 2001	**Collect post-implementation data**
July 2001	**Publish first full evaluation report**

Local staff will collect baseline information 1-3 months before installation of the PHDS in each SummitNet site. To the extent possible, state-level baseline data capture will cover the same period as the first round of local baseline data collection. The first post-implementation data capture will occur 2-4 months after the first round of PHDS installations. Thereafter, follow-up data will be captured every 6 months (spring and fall of each year) until the end of the third phase of IDEA.

1.6 Activities to Date

The following are the IDEA Project evaluation activities to date:

- **Develop a preliminary evaluation plan as part of the WIC-IDEA proposal.**
- **Form an evaluation team with representation from each of the state public health programs involved in Phase I and II system development.**

- **Retain Dr. Michele Teitelbaum of Abt Associates to guide the development of an evaluation protocol and publish the IDEA Project Evaluation Protocol.**
- **Hold bi-weekly Evaluation Team meetings to continue development of Evaluation Plan and to identify data collection requirements.**
- **Engage Northwest Resource Consultants to participate in study design, lead data collection instrument development, manage survey and manual data collection, and produce initial data tabulations.**
- **Engage Thomas & Associates, Inc., to manage the completion of the evaluation plan and the operation of the evaluation component of IDEA.**
- **Complete all data collection instruments and procedures for pre-testing at IDEA's PHDS pilot sites.**
- **Complete the pretest draft of the IDEA Project Evaluation Plan.**

The IDEA Evaluation Team meets monthly to review and approve or modify proposed evaluation plans, measures of project success, data collection tools, and pretest plans. At those meetings, IDEA staff, IDEA consultants, and team members agree on the upcoming month's activities and assignments.

The Design and Evaluation Manager and the consulting Evaluation Manager report on the evaluation at quarterly meetings of the Data Integration Advisory Council (DIAC). The Design and Evaluation Manager has also presented the evaluation plan and approach to federal site visitors representing CDC-INPHO and the Health Resources and Services Administration's Maternal and Child Health Bureau. These reports and presentations often give rise to new ideas and concerns that the managers incorporate into evaluation planning. The DIAC has also been active in reviewing drafts of data collection instruments, and their comments have been incorporated into the survey and form development.

2 Methodology

2.1 Theoretical Model

The IDEA Project has adopted the conceptual model articulated in the IDEA Project Evaluation Protocol (Teitelbaum) for evaluating IDEA. A "causal chain" of indicators (see 1.2 above) is fashioned to measure the theoretical relationship between positive process and impact measures of IDEA's success and positive client outcomes. Because of small population size, the techniques for evaluation under this model must include multiple measures from multiple sources to ensure reliability and generalizability of the data.

The approach is to take measurements over time, as well as across different types of public health systems, to establish change over time regardless of barriers to service coordination represented by differences in type or location of public health agencies. Measures include program and area descriptors, department and public health program capacity indicators, client demographics, program and process measures, client and population risk indicators, and client and population outcome measures.

Baseline data will be collected before the first phase of IDEA is implemented in local health departments (LHDs). (Section 4.3 covers the process of identifying, defining, and selecting specific measures for the IDEA evaluation.) The baseline data include:

- **State-level data extracted from existing state or national information systems such as the Behavioral Risk Factor Survey System (BRFSS) and Montana Vital Statistics.**
- **The state-level mirrored WIC database and state-level aggregates of current local MCH and immunization systems.**
- **Survey data collected from LHD staff about the client intake, referral, and case management processes that IDEA is designed to streamline or facilitate.**
- **Survey data collected from a sample of LHD clients on their current opinions about those processes and services.**
- **State-level data provided by program staff about local programs served by IDEA.**
- **Local, manually recorded data about public health program intake, referral, and case management.**

Essentially the same data will be collected after the PHDS is implemented. Most local-level data—other than from the opinion surveys—will come from the IDEA systems. These data will correspond to the baseline state-level aggregates of local data and local, manually recorded data. State program and LHD staffs will need to provide manually collected data only when the LHD has chosen not to use the relevant IDEA data capture capability or the local service is provided by a federal or private agency that has chosen not to participate in IDEA.

The time-series measurement approach assumes that change in measures will be the result of change in the underlying processes or the impact of those processes on the population. One of the confounders to this kind of analysis is the measurement process itself. When a population is subjected to repeated measures, some of the response of

that population may be to the measurement process and not to the process measured. To guard against adverse impact of the measurement process on the results, the following steps will be taken:

- **Survey data collection will focus on the health service systems and processes that IDEA is intended to streamline or facilitate, not on the software.**
- **To guard against biasing opinions about computer systems, clients will not be informed that the survey concerns a software system; rather they will be told the ultimate goal under evaluation—to improve services to LHD clients.**
- **Survey data collection will occur twice per year over two-week intervals, reducing the likelihood that repeat respondents will remember their previous responses.**
- **Survey data will be collected at all LHDs—even those serving small, rural populations—before the PHDS is installed at the SummitNet locations.**
- **Most manual data collection will occur only once, before the PHDS is installed, in each LHD with a permanent, full-time staff of two or more. After implementation of the IDEA software, most data will come from public health information systems.**
- **After the installation of the PHDS at all SummitNet locations, no further baseline data will be collected.**

IDEA information systems installed after the last SummitNet installation of PHDS will be Web-enabled or state-level systems. The development of the Web-enabled PHDS software will complete Phase I. The Phase II Sharing of Public Health Information (SOPHI) is a Web-enabled system capable of linking local public health agencies that want to participate in the local network. Phase II installation may begin at SummitNet sites before the Web-enabled part of Phase I is completed. At that point, public health workers and clients throughout Montana are likely to be aware of the IDEA Project and even knowledgeable about it. Thus, baseline data collection, where the baseline is defined as the point before change has occurred, will be impossible. The 27 SummitNet locations are dispersed throughout Montana and cover 85% of her population, including many rural and frontier areas. Therefore, the loss of baseline data—other than survey data—from locations serving small, rural or frontier populations (generally fewer than 10,000 persons) is seen as the least biasing of the available options.

2.2 Sampling Plan

The goal of sampling is to reduce the cost and burden of data collection while ensuring that the data represent the whole population and all processes under study. In this case, the population is everyone living in Montana because all are affected by the improvement of statewide systems to improve health services, measure the health of the public, and assess the impact of publicly funded programs. Generally, a whole population cannot be assessed and evaluators define a "sampling frame" that will do a reasonably good job of getting the needed information. In this case, the sampling frame consists of the staff and clients of all local health departments in Montana because these are the persons the IDEA Project affects most immediately and directly.

The sampling frame excludes state level public health workers and the general public, but the overall evaluation plan does not. The evaluation plan includes system development monitoring, which will capture qualitative and quantitative measures of

IDEA's impact on state level staff and its usefulness to state MCH program personnel. The population-based measures assess the longer-term impact of changed public health services on all Montanans. To the extent that one accepts the causal chain linking system improvement with health improvement, the use of outcome measures based on vital statistics, the Behavioral Risk Factor Survey System (BRFSS), and other state-level data will provide evaluators an assessment of the impact of IDEA on the general public.

Point-in-time sampling will be used to collect information from LHDs and their clients about public health services and related administrative activities that the PHDS is intended to streamline or facilitate. Data will be collected from all staff and clients at all LHDs twice per year for two weeks at each point in time sampled. All LHD staffs and clients will be surveyed. All LHDs with two or more full-time equivalent (FTE) staff members will collect and provide administrative data. The procedure will consist of surveying every client seen during a two-week period and, during that same two-week period asking LHD staff to complete opinion surveys and collect the other data required to measure management and administrative change. Before installation of IDEA's Phase I software, administrative data will be hand-entered onto specially designed forms and logs or extracted from existing, local administrative systems. After the software implementation, local staffs will collect the required data other than survey data as part of the IDEA's normal operation.

2.3 Instrument Development

The IDEA Design and Evaluation Manager, Northwest Resource Consultants, and Thomas & Associates, Inc. originally conceived the survey instruments (tools). This instrument development team met with the full Evaluation Team to review and further develop the data collection instruments. As the instrument development team modified the instruments and developed written procedures, the Evaluation Team and DIAC members had two more opportunities to review the data collection tools. Additional reviewers were sought from LHDs to provide a balance of agency size and perspective.

Northwest Resource Consultants incorporated all comments into revised surveys and logs and reviewed changes with the instrument development team. The draft pretest package was provided to the Evaluation Team and the DIAC for a final review, which produced a few procedural questions and no other comments. Steps in the development of data collection plans and tools are discussed in part 4, with supporting documentation in Appendices A through N. The pretest-ready instruments and procedures appear in Appendix O.

2.4 Analysis Plan

A valid, reliable comparison of the baseline and post-implementation measures shows changes over time (if external events have no significant impact). If results are similar for services that are electronically linked and those that are physically co-located, we have evidence that improvements are at least in part due to the IDEA Project. If improvements in population-based measures occur in parallel with the IDEA project, this trend is progress toward the long-term goals of the project (whatever the "true" cause of the trend). Perceptions of improved services and evidence of increased cost-

effectiveness add to the indications that IDEA is accomplishing its goals. Part 4 of this report presents and discusses the full analysis plan.

2.5 Lessons learned

2.5.1 Narrowing of Data Requirements

The universe of data elements obtained and managed by programs (collectively) is wide. For purposes of evaluating IDEA, this universe must be narrowed. Always difficult, this task may have been better managed by developing the collection instruments for all data elements first, and second, having program staff pick and choose which elements could be best managed in the data collection process. Instead, the Design and Evaluation Manager generated the list of all possible measures, based on the IDEA Projects SSDI grant application, WIC/IDEA Proposal, IDEA Evaluation Protocol, and CDC grant application. She then worked with the Evaluation Team to pare down the list by identifying existing data sources and methods of collecting data manually. Theoretically sound, in reality this approach caused greater work effort to not only get the lists to those persons who could make a decision but also to get a decision in a timely manner. Ultimately, the instrument development team pared the list of measures further through the instrument development process and used the instruments themselves to present measures to the Evaluation Team and DIAC.

2.5.2 Team Effort

Due to the methodology adopted (comparison across programs, multiple measures and data sources), it quickly became evident that only a sustained team effort could successfully accomplish the task. Regular face-to-face meetings and electronic mail contact helped to keep the team focused and on track.

2.5.3 Time to Design Data Capture Process

Because many programs (WIC, MIAMI, Immunization, Follow Me) have separate, statewide information that is collected routinely by LHDs and reported to the state agency, a systematic process to capture previously agreed upon, common data elements from all systems has not been developed. Staff involved in integrated system development need to consider the relationship between that effort and the evaluation of project success from the outset because agreements on common data elements during the evaluation design can inform the necessary development of a common database. Beginning to design the data capture process for the evaluation effort along with specifying the requirements of the new system is time well spent. This preliminary work pays off in two ways:

- **The evaluation data needed will be provided by the system being evaluated, which reduces measurement bias and burden.**
- **The measures designed to evaluate the project can also be used in the data requirements for the data warehouse for ongoing program evaluation.**

For both reasons, this effort is worth the time invested and is worth doing right.

2.6 Next Task

The next step in the IDEA Project evaluation is to pre-test the evaluation process and revise data collection and analysis plans where indicated. The pretest step includes pre-testing local data collection instruments and state level data extraction processes, analyzing pre-test data, revising data collection instruments and procedures, and reporting on results and lessons learned for the wider audience of public agencies faced with the challenges of developing integrated systems.

3 Data Collection

3.1 Overview

Most of the data needed for evaluation can be extracted from existing program databases or from the IDEA systems.

Some of the most useful data must, however, be collected directly from LHD clients and staff. This information will be collected through surveys of staff and clients and manually by local public health agency staffs for the baseline measures of client intake, referral, and case management.

The general approach to data collection includes:

- **Collect process data about the computer system changes, to see**
  - **Whether the PHDS meets local information capture and reporting needs.**
  - **Whether the SOPHI system improves information sharing and reduces duplicate data entry.**
  - **Whether IDEA reduces staff time on data input and reporting.**
  - **Whether clients and users perceive improvements in the public health system.**
- **Collect process and impact data about local public health services, to see**
  - **How automation affects program staffs' ability to identify client needs and help clients accept or seek appropriate services.**
  - **How automated referral and follow-up affect client retention and early entry into programs.**
  - **How automated communication affects service coordination among local agencies.**
- **Collect limited data on health outcomes, to see**
  - **Whether client health improves in ways that the conceptual model identifies as related to the impact of automation.**

- **Whether improvement trends are consistent with the progress of IDEA implementation regardless of the proximity of local public health agencies to each other.**

Appendices A through L show the specific data to be collected from each data source. The Database Design Charts in part 4 (pages 17 through 22) show how these data will be brought together into an evaluation database. The measures to be used in analysis are defined in Appendix N, and the analysis plan appears in part 4.

3.2 Baseline Data Collection

The evaluation team will collect baseline data from the following sources:

- **State-level systems that receive their data from locally operated public health programs that will be replaced by IDEA systems. These include:**
  - **Follow-Me data on home visits and case management for families of CSHCN**
  - **MIAMI intake and outcome data on high risk pregnant women**
  - **Family planning data on intendedness of pregnancy**
- **The WIC state-level mirrored database containing basic data on all local clinic transactions**
- **County immunization rates—the state's calculations using CASA and local registry data**
- **Manual data collection instruments or reports from local systems, including:**
  - **Appointment Log**
  - **Client Intake Visit Tracking Log**
  - **Referral Out Log**
  - **Administrative Data Form**
- **Other state-level systems that provide specific health statistics**
  - **Population data providing denominators for rates, ratios, and proportions**
  - **Vital statistics data on births, deaths, fetal deaths, and induced abortions**
  - **Medicaid data on EPSDT screening rates and routine care for CSHCN**
  - **Communicable disease registry STD rates**
  - **Trauma registry serious injury/death-on-scene rates**
  - **Behavioral Risk Factor Survey System rates on diabetes and maternal diabetes**
  - **Sample survey data on intendedness of pregnancy**
- **Attitude and opinion survey from persons most directly affected by IDEA's first two phases**
  - **Staff opinion survey for LHD workers**
  - **Client opinion survey for recipients of local public health services**
- **Other health care providers**

- **Hospital information on NICU admissions and screening**

As discussed above, we will collect only survey data from the Web-enabled sites at baseline, because the IDEA software will be in use throughout Montana prior to the Phase I installation at those smaller sites. The intent of baseline data collection is to establish a base measurement before the intervention, but not so long before that other conditions could account for any change observed. It will not be possible to find a time when the necessary criteria for baseline data collection would obtain at the smaller, Web-enabled sites.

3.3 Follow-up Data Collection

The approach to follow-up data collection will follow the baseline data collection approach except that the PHDS and SOPHI systems will provide electronic data to replace the manual data collection instruments (other than surveys) and reports from local systems. Note that Montana's local health agencies are not organizationally tied to DPHHS, so those locations that choose not to implement the IDEA software will continue to provide data manually or from their existing systems.

3.4 Data Collection Tools and Protocols

3.4.1 Survey Data Collection

Northwest Resources Consultants has worked with IDEA evaluation staff to construct the survey tools to be used by the LHDs. The package of materials has been offered to DPHHS Evaluation Team, the DIAC, and LHD staff for review. Comments or suggested revisions have been incorporated into the materials enclosed with this report in Appendix O.

Local agencies will ask clients to participate in the evaluation by completing surveys on their experiences with the public health system. To reduce the potential for opinions about computer systems, rather than about the services those systems are intended to facilitate, clients will not be told that the survey pertains to a new public health data system.

Staff will also be asked to complete opinion surveys that will be described as part of the IDEA Project evaluation.

3.4.2 Agency Staff Manual Data Collection

Local agency staff will be asked to manually collect information about staff size and counts of clients served, referral and referral follow-up, and client intake.

If an LHD already collects data in a format similar to the Evaluation instruments, data from that existing electronic or manual system will be substituted for the IDEA data collection forms and procedures. Ideally, the same instruments should provide all data.

However, the evaluation team has decided that the added burden of data collection is excessive if a local agency already has a system in place for collecting the necessary data. Most of the data that LHD staffs are to provide are administrative budgets, staffing tallies, and counts of events. As such, they are not very susceptible to unreliability or invalidity because of the medium of data collection.

3.4.3 Data Management and Project Liaison

Northwest Resource Consultants will provide survey forms, manual data collection logs, instructions for completing and returning the forms to Helena, data entry, data preparation, and preliminary tabulations.

Thomas & Associates, Inc. will act as a liaison between LHDs, Northwest Resource Consultants and DPHHS to ensure smooth operations and a minimum of disruption to local program activities.

3.4.4 Timing of Local Data Collection

Each LHD will be asked to submit data collection forms according to a mutually agreed-upon schedule in keeping with the goal of two-week data collection efforts at six-month intervals throughout the life of the project. Once the PHDS pilot is complete and IDEA staff has developed a rollout schedule, the Evaluation Manager will develop a baseline data collection schedule. Because the software must be rolled out over a large geographic area, the baseline data collection will extend over several months. The baseline data collection schedule will balance the need to minimize biasing effects of extended data collection, the seasonal duties of local public health service workers, the requirements of the PHDS rollout, and the need to maintain reasonable concurrence in local and state-level baseline data capture.

3.5 Pilot Sites

Two local public health agencies, the Butte-Silver Bow Health Department ("Butte") and the Missoula City-County Health Department ("Missoula"), have agreed to pilot the PHDS. The timeline for those pilots is dependent on the completion, unit testing, and user acceptance testing of the software. The pretest of the evaluation data collection process will begin one to three months prior to the pilot tests of the PHDS software. These pretest data will likely be collected in January 2000. The IDEA Project Management Team will determine the precise schedule. If the pretest identifies the need for extensive revision of the instruments, the pretest data will not be included in further analysis. Because Butte and Missoula are two of the eight largest LHDs, pretest data will be retained for baseline analysis if possible.

3.6 State Level Data Extraction

After data extraction procedures and database dictionaries have been finalized, state program staff will extract the designated data elements from state systems. The state level data extraction will follow the pretest of baseline data collection instrument. To the

extent possible, state-level baseline data extraction will cover the same period as the local data collection.

3.7 Report on Pilot and Baseline Data

During statewide rollout of the PHDS, Thomas & Associates, Inc., will oversee the preparation of a written report documenting the results of the baseline data collection and evaluation. The analysis will include descriptive statistics and tabulation or graphic representation of baseline measures. Revisions and modifications to surveys and manual data collection instruments and procedures will be included. The report will form the basis for recommendations for evaluating the statewide rollout.

3.8 PHDS Statewide Rollout

Statewide rollout of the PHDS software is planned for Montana counties that have, or will have, a connection to SummitNet (the state Wide Area Network) beginning in April 2000. The current or proposed SummitNet site is listed in the table below, by county name.

1.Beaverhead	**10.Fergus**	**19.Roosevelt**
2.Big Horn	**11.Flathead**	**20.Rosebud**
3.Blaine	**12.Gallatin**	**21.Sheridan**
4.Broadwater	**13.Glacier**	**22.Sweet Grass**
5.Carbon	**14.Lake**	**23.Valley**
6.Cascade	**15.Lewis & Clark**	**24.Wibaux**
7.Choteau	**16.Park**	**25.Yellowstone**
8.Custer	**17.Ravalli**	
9.Dawson	**18.Richland**	

3.9 Baseline Data Collection

Ideally, local baseline data collection would occur in all LHDs about two to four months prior to PHDS rollout, and state-level baseline data would cover events occurring during approximately the same time period, probably the spring of 2000. The timing and duration of the PHDS rollout will affect the ability to attain that ideal. As stated above, the Evaluation Manager will schedule baseline data collection balancing local needs and constraints against data quality issues.

3.9.1 SummitNet

Baseline data collection will occur at all SummitNet sites. Collection of survey and manually logged data will occur one to three months prior to the first PHDS software installation in each group of counties.

3.9.2 All Other Counties

A web-enabled version of the PHDS will be installed at the remaining 36 LHDs. The Phase II software (SOPHI) can be functional and available immediately after the Phase I installation in the SummitNet sites, possibly before the web-enabled PHDS is available. Because of this limitation, only survey data can be collected at smaller local sites; those sites will be surveyed at the same time as nearby SummitNet sites. In any case, other manual data collection at these sites would have been difficult or impossible because of the small staff sizes: most of these LHDs have fewer than two full-time public health workers.

3.10 Post-implementation Data Collection

Local post-implementation data capture will occur every six months, probably in September and March. State-level client data capture will cover events in September and March. Data capture for population-based measures will depend on the availability of data from those systems and will probably occur in the late fall and late spring of each year.

As discussed above, on site post-implementation data collection will likely be limited to staff and client surveys. Extraction of local data will be simpler due to the presence and use of PHDS and SOPHI. The survey instruments, procedures, data entry, data preparation, and analysis will mimic the respective baseline activities.

4 Analysis Plan and Presentation of Analysis Results

4.1 Analysis in the Context of Montana

As noted in grant applications and reports from Montana, the state is classified as "frontier," indicating a population of 6 persons or fewer per square mile. This small population can make it impossible to differentiate true change from random fluctuation, however accurate the data.

The Teitelbaum report[2] notes that "even intermediate service utilization outcomes – such as increased used of prenatal care services – may take longer to demonstrate because of the small population served by each program and the significance of small changes in uncontrolled factors."

Previous sections have presented the following strategies, which can help compensate for the small population and high level of random variability in the data:

- **Multiple measures of the same processes or outcomes from multiple data sources**
- **Data grouped by type of local health agency rather than examined county by county**

In addition to the small numbers issue, the dispersion of Montana's population poses threats to the measurement process. We recognize, for example, the validity issues in grouping baseline data collected at different times (from groups of rollout sites and state databases) and using different data collection strategies (for example, manual local and state baseline data logging combined and compared to electronic post-implementation data). However, these strategies are necessary to collect data from and about counties that are the geographic equivalent to Rhode Island or Connecticut with populations that rarely exceed 50,000.

The first step in the analysis of data from each source will be tests of reliability and validity and an analysis of demographic factors to assess generalizability. Clearly invalid or unreliable data will be excluded from further analysis, and the evaluation team will take appropriate steps to ensure the quality of data subsequently collected.

Once the analysis datasets are developed, the evaluation team will again examine the data carefully, assessing whether the results are likely to be representative of Montana's public health clients—or of all Montanans, depending on the measure—and using the multiple measures to help establish reliability and validity.

4.2 Analysis Database Design

The evaluation measures are described in Appendix O. The charts on the following pages show the conceptual design of the analysis database for baseline and follow-up

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[2] Teitelbaum, Michele, Ph.D., IDEA Project Evaluation Protocol, Abt Associates, Inc., 1998

data collection. These charts show how data sources will be grouped to provide analysis measures for locations, clients, encounters, and segments of the population.

(See Other Links For Pages 17-22)

IDEA Bas1

IDEA Bas2

Foll1

Foll2

IDEA Surv

IDEA Outc

The analysis database will contain the following types of analysis tables or files:

- **System performance data—including data capture time studies for current systems and the PHDS and SOPHI system.**
- **County-agency-level and program-location-level records—quantitative measures of client demographics, program capacity, and program processes.**
- **Client-level and encounter-level records—measures of client demographics, risk, service access, program impact, and outcomes.**
- **Population-based and Medicaid records—impact and outcome measures aggregated to the county-agency level**
- **Client survey records, staff survey records, and BRFSS data—behavioral measures of services and risk factors**

4.3 Description of Baseline Evaluation Measures

To begin the process of defining evaluation measures, the IDEA Design and Evaluation Manager identified and obtained definitions for all possible measures identified in the IDEA Evaluation Protocol or any Project grant application or proposal. After the measures were defined, the Evaluation Team was asked to provide data sources for each measure and to identify any measures that were not available from any existing data source. The following were the criteria for eliminating measures from the evaluation:

- **Measures based on data that were too time-consuming or costly to collect.**
- **Measures that, because of Montana's small population, could not produce meaningful results unless aggregated over time. (Note that measures in this category, while not usable for point-in-time sampling, may be valuable for gauging IDEA's impact in some other context.)**
- **Evaluation Protocol measures dropped in favor of those proposed by evaluation team, either to facilitate data collection or because Dr. Teitelbaum's proposed measure is less meaningful in Montana than nationally (for example, because the proposed measure is based on national trends that do not apply in Montana).**
- **Evaluation Protocol measures dropped in favor of MCH performance measures. If the measure failed one or more of the above tests, it was dropped from the protocol.**

The evaluation team eliminated ten of the measures identified in the IDEA Evaluation Protocol because of the data collection burden involved. Most of the measures eliminated could only be collected from hospital discharge data, similar encounter-based data, or the client or staff surveys. The following problems exist:

- **Montana does not have a hospital discharge database.**
- **While the IDEA software will provide encounter data, the time-series nature of the analysis requires a data source before implementation of the PHDS and comparability of pre- and post-implementation data.**

Thus, only those elements in an existing data capture system or those that could be collected by manual data capture could be considered. In a number of cases, it will be necessary to limit the data used or the type of public health clients included although the PHDS will provide more data about more clients. For example, the baseline data on CSHCN will come from the Follow Me data system, which documents the home visiting program for families of CSHCN. Those data will be compared to the home visit data available from the PHDS after PHDS implementation, even though the PHDS will provide more than home visit data on CSHCN.

Where the client or staff survey could provide the data, a major consideration for retention of a measure was the number of questions required to obtain good survey data. In many cases, the measures dropped could be collected by survey, but the burden on respondents was prohibitive, especially for a self-administered survey of public health clients. The conditions for completing the survey and client reading and form completion skills are the limiting factors here. In fact, the survey pretest may demonstrate the need for further simplification.

4.4 Measures Eliminated Because of Difficulty of Data Collection

4.4.1 Department/Program/Area Capacity Measures

- **Percentage of adults surveyed whose children have a medical home = number of children shown on adults' surveys as having a medical home ÷ number of children identified by the survey responses as household members (baseline data available from Follow Me system on only a subset of the PHDS population; too many questions required for survey)**
- **Percentage of families of CSHCN surveyed with a medical home for CSHCN = number of children in Follow Me for whom a parent or guardian reports a medical home ÷ number of Follow Me families surveyed (baseline data from Follow Me system may be invalid; too many questions required for survey)**

4.4.2 Program/Process Measures

- **Rate of referral for preventive care: physical, sight, hearing, dental, and nutrition = number referred for stated reason ÷ number of persons actively enrolled in program (data will be available in SOPHI, but baseline data not available)**
- **Percentage of clients surveyed referred for previous care: physical, sight, hearing, dental, and nutrition = number referred for stated reason ÷ number of persons responding to survey item (data will be available in SOPHI, but baseline data not available; too many questions required for survey)**
- **Percentage of pregnant women surveyed referred for counseling/treatment for smoking = number referred for stated reason ÷ number of persons responding to survey item (baseline data will be available in MIAMI system on a subset of the population; too many questions required for survey)**
- **Percentage of pregnant women surveyed referred for counseling/treatment for alcohol & other drugs = number referred for stated reason ÷ number of persons**

responding to survey item (baseline data will be available in MIAMI system on a subset of the population; too many questions required for survey)

- **Clients surveyed whose breastfeeding decisions were influenced by MCH/WIC program = number reporting breastfeeding decision influenced by MCH/WIC ÷ number of responses to the item (too many questions required for survey)**
- **Percentage of clients surveyed who changed breastfeeding behavior = number reporting change in breastfeeding behavior ÷ number of responses to the item (baseline data will be available in MIAMI system on a subset of the population; too many questions required for survey)**
- **Percentage of clients surveyed complying to previous guidelines: physical, sight, hearing, dental, nutritional = number reporting compliance to guidelines ÷ number of responses to the item (baseline data will be available in MIAMI and Follow Me systems on a subset of the population; too many questions required for survey)**

4.4.3 Outcomes

- **Percentage of mothers who breastfeed their infants at hospital discharge = number of women reporting breastfeeding at discharge ÷ number of women responding to survey item (no hospital discharge database; too many questions required for survey)**

4.5 Analytic Approach

After the initial data quality checks and database construction, the analysis approach will include the following steps:

- **Generate descriptive statistics**
- **Generate process, impact, and outcome measures at the state level**
- **Conduct reliability and validity tests of the data**
  - **Internal consistency of measures across locations and throughout the rollout period**
  - **Reliability across measures of the same process or outcome**
  - **Analysis of client and respondent demographics to determine generalizability**
  - **Qualitative analysis of local data collection procedures, problems, and events to identify differences or problems in the data collection process.**
- **Group the data by analysis categories (such as program location or co-location type) and generate process, impact, and outcome measures for each group.**
- **Conduct preliminary tests of the hypothesis that physical co-location affects communication among programs.**
- **Use regression and factor analysis to determine factors that account for differences across groups.**

The tests for data reliability and validity will include Chi Square and tests of differences in means. It is likely that other tests of data quality will be used, depending on the

preliminary data quality results. Invalid responses or data elements will be eliminated from the analysis database. Measures found to be unreliable will not be used. Deficiencies in generalizability will be adjusted by weighting, increasing required significance level, or modifying the analytic approach, as appropriate.

The tests of evaluation measures and hypotheses will depend on the measures retained for analysis, but will likely include regression analysis, factor analysis, analysis of variance, and other tests of means to determine the extent of the differences across groups and the factors that account for those differences. Confidence intervals and other tests of significance will test the significance of differences between groups. Tests of random variability will be used to evaluate the usefulness of population-based measures in demonstrating true change in program impact and outcomes.

4.6 Sample Data Tabulations

Sample tabulations of staff and client survey data appear in Appendix M. The last table in that Appendix provides a sample of baseline data tabulations of other measures.

4.7 Reporting of Findings

The IDEA Evaluation Reports will be prepared for State MCH, WIC, and Immunization Program Managers; LHD and other local agency administrators; and a national audience of program and research managers. In general, the reports and the target audiences will be as follows:

Report Type	National	State	Local
Evaluation Results: General Findings, Lessons Learned, ar Recommendations for Future Data Integration Projects	**X**	**X**	**X**
System Use Time Studies and Other Detailed or County-Specific Reports		**X**	**X**
Detailed Analytic Report: Research Hypotheses and Other Test Results	**X**	**X**	
Evaluation Methodology: Lessons Learned and Recommendations for Future Efforts	**X**	**X**	
Evaluation Protocols and Plans	**X**	**X**	**X**

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